REMARKS

Applicants amend claims 1, 4 and 10, and cancel claims 2-3. Hence, claims 1 and 4-15 are pending, of which claim 1 is independent. Applicants note with appreciation that the Examiner deems claims 14 and 15 to recite allowable subject matter notwithstanding being dependent upon a rejected base claim. For the reasons set forth below, however, Applicants respectfully submit that the amended claims define over the art of record. Applicants submit herewith a Supplemental Information Disclosure Statement.

Objection to the Specification and Claims

The Examiner notes on page 2 of the Office Action that minor informalities exist in the specification and claims. In response, Applicants amend the specification and claims as recommended by the Examiner. Applicants accordingly request that the Examiner reconsider and withdraw the objections to the claims and specification.

The Claimed Invention

Amended claim 1 recites a diffusion member comprised of a foamed member made of metal material *and* a resinous member. The resinous member has resinous flow field walls flush with the foamed member for forming a reactant gas flow field in the foamed member, and a reactant gas flowing through the reactant gas flow field along the electrode. The resinous flow field walls extend from opposite ends of the electrode and forms a passage extending in a serpentine pattern.

An advantage of the claimed invention is it forms a fuel cell where no excessive pressure is applied to a metal foamed member of a diffusion member so that the foamed member is protected and is not deformed undesirably.

Rejection of claim 1 under 35 U.S.C. §102(b)

The Examiner rejects claims 1 under 35 U.S.C. §102(b) as being anticipated by United States Patent Publication No. 2002/0068214 to Reiser ("Reiser"). To establish a prima facie case of anticipation, each and every element and limitation of the present invention must be

disclosed expressly or inherently in a single prior art reference. Applicants respectfully submit that the Reiser reference does not disclose each and every element of claim 1.

Claim 1 recites a diffusion member including a foamed member made of metal material, and a resinous member in the foamed member.

In contrast, the Reiser reference discloses a coating or a film of a dry-out barrier material, such as a resin material, is applied to a gas diffusion layer. The Reiser reference does not teach or suggest employing a diffusion layer including a foamed member made of metal material, and a resinous member in said foamed member.

In the Office Action, the Examiner notes that the foamed metal is a common material for use in a diffusion layer. However, the Reiser reference does not expressly or inherently disclose the use of a foamed member made of metal material. Furthermore, the Reiser reference only discusses the use of *a* single dry-out barrier material for applying to the gas diffusion layer, that is a diffusion layer impregnated with resin, and does not teach or suggest combinations of *multiple* dry-out barrier materials (i.e., a foamed metal material and a resinous material) employed to form the diffusion member.

Therefore, Applicants respectfully urge the Examiner to reconsider and withdraw the 35 U.S.C. §102 rejection of claim 1.

Rejection of claims under 35 U.S.C. §103(a)

Claims 1, 2, and 4 are rejected under 35 U.S.C. §103(a) as being obvious over United States Publication No. 2002/0114990 to Fly et al. ("Fly") in view of Reiser. Claim 3 is rejected under 35 U.S.C. §103(a) as being obvious over Fly in view or Reiser and further in view of United States Patent No. 5,108,849 to Watkins et al. ("Watkins"). The Examiner further rejects claim 3 under 35 U.S.C. §103(a) as being obvious over Fly in view of Reiser and further in view of United States Patent No. 6,099,984 to Rock ("Rock"). Claims 5-8 are rejected under 35 U.S.C. §103(a) as being obvious over Fly in view of Reiser and further in view of United States Patent Publication No. 2004/0137303 to Kuroki et al. ("Kuroki"). Claims 9-13 are rejected under 35 U.S.C. §103(a) as being obvious over Fly in view of Reiser.

Applicants amend independent claim 1 to include the limitations of original dependent claims 2 and 3. Applicants hereby cancel claims 2 and 3. Applicants respectfully submit that Reiser, Fly, Watkins, Rock, and Kuroki, alone or in any combination, do not teach or suggest the limitations of independent amended claim 1.

The Reiser Reference

As briefly discussed above, the Reiser reference discloses a fuel cell with an electrolyte dry-out barrier. The electrolyte dry-out barrier may be formed by applying a coating or a film of a dry-out barrier material to, or impregnating with the dry-out barrier material, the gas diffusion layer. Resin materials are noted by the Reiser reference as an example of a suitable dry-out barrier material. As set forth above, nowhere does Reiser teach or suggest the use of a multiple material/layer diffusion member employing a metal foamed member and a resinous member.

The Examiner also recognizes that the Reiser reference does not disclose flow field walls extending from opposite ends of an electrode alternately forming a serpentine passage, which is now recited by amended independent claim 1. Furthermore, nowhere does the Reiser reference discusses the forming of a reactant gas flow field in the foamed metal.

Applicants respectfully submit that the Reiser reference does not teach or suggest forming a reactant gas flow field in the foamed metal, where the resinous flow field walls extend from opposite ends of the electrode alternately, and the reactant gas flow field comprises a passage extending in a serpentine pattern, as recited by amended independent claim 1.

The Fly Reference

The Fly reference discusses a fuel cell with variable porosity gas distribution layers. The Fly reference is related to a fuel cell having an improved bipolar plate assembly to increase the electrical energy output of the fuel cell for a given size, weight, and cost. The Examiner recognizes that the Fly reference fails to teach a resinous member in the metallic foam gas distribution layer. Although the Fly reference discusses the use of foamed metal, the Fly reference does not teach or suggest a resinous material may be used in the foamed metal.

Additionally, it is not obvious that two materials may be randomly combined, while concomitantly achieving or maintaining desired the chemical properties of the diffusion member.

The Examiner further acknowledges that Fly does not disclose flow field walls extending from opposite ends of an electrode alternately forming a serpentine passage, which is now recited in amended independent claim 1. Furthermore, nowhere does the Fly reference teach or suggest the forming of a gas flow field in the foamed metal.

Applicants respectfully submit that the Fly references does not teach or suggest forming a reactant gas flow field in the foamed metal, where the resinous flow field walls extend from opposite ends of the electrode, and the reactant gas flow field comprises a passage extending in a serpentine pattern, as recited by amended independent claim 1.

The Watkins Reference

The Watkins reference describes fluid flow field plates for use in a fuel cell. Each plate includes a single continuous fluid flow channel configured in a serpentine manner. The channel is an open-face groove and is defined by sidewalls so that the channel is formed in a zigzag pattern. These channels are formed by cutting materials out of the anode and cathode plates, whereas the flow fields as recited in claim 1 is formed by the resinous materials in the foamed metal and the flow field walls are flushed with the foamed metal.

Applicants respectfully submit that it is very different to form channels by cutting materials out of anode and cathode plates as compare to forming channels by a resinous member which is embedded in foamed metal. The Watkins reference therefore does not teach or suggest forming a reactant gas flow field in the foamed metal, where the resinous flow field walls extend from opposite ends of said electrode alternately, and form a passage extending in a serpentine pattern.

Applicants respectfully submit that Watkins does not teach or suggest the limitation of forming a reactant gas flow field in the foamed metal, where the resinous flow field walls extend from opposite ends of the electrode alternately, and the reactant gas flow field comprises a passage extending in a serpentine pattern, as required by amended independent claim 1.

The Rock Reference

The Rock reference discusses mirrored serpentine flow channels for use in a fuel cell. These channels are provided between adjacent legs extending from opposite ends of the electrode. These channels are also formed on the anode and cathode plates like the Watkins reference. Applicants respectfully submit that it is very different to form channels by cutting materials out of anode and cathode plates compare to form channels by a resinous member which is embedded in a foamed metal.

Accordingly, Applicants respectfully submit that the Rock reference does not teach or suggest the limitation of forming a reactant gas flow field in said foamed member, wherein said resinous flow field walls extend from opposite ends of said electrode alternately, and said reactant gas flow field comprises a passage extending in a serpentine pattern, as required by amended independent claim 1.

The Kuroki Reference

The Kuroki reference discusses a manufacturing method for a fuel cell to prevent an electrolyte membrane being broken and to simplify the assembling step for the fuel cell is made easy. However, nowhere does Kuroki discusses forming a reactant gas flow field in the foamed member, where the resinous flow field walls extend from opposite ends of the electrode alternately, and the reactant gas flow field comprises a passage extending in a serpentine pattern.

Applicants respectfully submit that the Kuroki reference does not teach or suggest forming a reactant gas flow field in said foamed member, wherein said resinous flow field walls extend from opposite ends of said electrode alternately, and said reactant gas flow field comprises a passage extending in a serpentine pattern, as required by amended independent claim 1.

CONCLUSION

As set forth above, none of the cited references teach or suggest the limitation of forming a reactant gas flow field in the foamed member, where the resinous flow field walls extend from opposite ends of the electrode alternately, and form a passage extending in a serpentine pattern. Therefore, any combination of Reiser, Fly, Watkins, Rock, and Kuroki does not teach or suggest all the limitations of amended independent claim 1.

Accordingly, Applicants respectfully request the Examiner to reconsider and withdraw the rejection of independent claim 1 and its dependent claims 2-13.

In view of the above amendment, applicant believes the pending application is in condition for allowance.

Applicant believes no fee is due with this statement. However, if a fee is due, please charge our Deposit Account No. 12-0080, under Order No. TOW-038 from which the undersigned is authorized to draw.

Dated: February 24, 2005

Respectfully submitted,

By _____

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